

JVC

SERVICE MANUAL

MODEL
QL-7

QUARTZ-LOCKED DIRECT DRIVE TURNTABLE



No. 2405
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1. Specifications

Motor section	
Motor	: 12-pole, 24-slot, DC type FG servomotor
Drive system	: Direct drive
Speeds	: 33-1/3 and 45 rpm
Wow and flutter	: 0.025 % (WRMS)
Rumble	: More than 63 dB (IEC-B)
	: More than 74 dB (DIN-B)
Speed detection	: Integrated frequency generator
Starting torque	: 1 kg.cm
Speed deviation	: Within 0.002 %
Load characteristics	: 0 % (with 120 g total tracking force)
Drift per hour	: 0.0001 %/H
Power characteristics	: 0 % (± 10 V)
Temperature characteristics	: 0.00005 %/°C
Platter	: 31.3 cm diam.
Quick stop time	: Within 1 turn
Tonearm section	
Type	: T.H. (Tracing-Hold system, static balance, new gimbal support)
Effective length	: 245 mm
Tracking error	: + 1°48' - 1°31'
Overhang	: 15 mm
Tracking force range	: 0 - 3 g (0.25 division, direct reading)
Weight range (including shell)	: 14 - 21.5 g (Headshell 12.5 g)
Height range	: 43.5 - 54.5 mm (preset to 48.5 mm)
Cartridge section (for Europe only)	
Type	: Moving Magnet (MD-1025)
Stylus	: 0.5 mil. diamond (DT-Z1TE)
Optimum tracking force	: 2 grams
Out put	: 3mV (1 kHz)
Frequency response	: 10 - 25,000Hz
Separation	: More than 25dB
Load Resistance	: 47 - 100k ohms
Compliance	: 25 x 10 cm/dyne
General	
Dimensions	: 16.2 (H) x 47.7 (W) x 40.1 (D) cm (with cover closed) (7-3/16" x 19-5/16" x 16-3/16") (Since the dimensions show only the design measurements, consideration is required when installing the unit in a limited space such as a rack.)
Weight	: 10.8 kg (23.8 lbs.) (without corrugated cardboard case)

POWER SPECIFICATIONS

Countries	Line Voltage & Frequency	Power Consumption
U.S.A. & CANADA	AC 120 V, 60 Hz	15 watts
CONTINENTAL EUROPE	AC 220 V, 50 Hz	15 watts
U.K. & AUSTRALIA	AC 240 V, 50 Hz	15 watts
U.S. MILITARY MARKET	AC 100, 120V/220, 240 V Selectable, 50/60 Hz	11.5 watts
OTHER AREAS	AC 100, 120 V/220, 240 V Selectable, 50/60 Hz	15 watts

2. Service Precautions

1. Be sure to place the unit on a level surface when adjusting motor rotation.
2. In servicing, do not use parts other than those specified.
3. Be careful not to damage the motor shaft when repairing the motor unit.
4. When a motor cannot be repaired and must be replaced, it is recommended that the motor and motor circuit board (TXX-38B or C) be replaced at the same time. Hall element current adjustment is required for replacement of the motor or motor circuit board only is performed. Refer to the "7-(3) Balance adjustment of drive circuit".
5. When the heat-sink (including X820) is removed from the motor board to permit repair of the circuit board, the transistor temperature may increase due to the lack of heat radiation. Attach a aluminum plate (approx. 100 (W) x 100 (D) x 1 (H) mm to the motor board.)

3. Features

- **High-torque, precision FG servomotor**
The 12-pole, 24-slot DC servomotor provides a strong torque of more than 1 kg.cm.
The built-in frequency generator speed detecting mechanism produces signals which assure smooth, stable platter rotation.
- **Quartz-locked phase control system**
The system controls rotation speed through phase comparison between the reference signal of the highly accurate crystal oscillator and the frequency generator detecting signal, thus greatly improving speed deviation, temperature characteristics, initial drift and voltage characteristics. The system serves to effectively eliminate lower frequency wow which has previously been impossible to eliminate with only the basic servo system.
- **High performance sample-hold type phase comparison circuit**
A sample-hold type phase comparison circuit is employed to obtain a control signal with minimum ripple. The less the ripple, the smaller the time constant of the motor drive smoothing circuit, which results in a quicker response to servo control.
- **Touch-sensor control and quick stop**
Touch-sensor type speed selectors and stop switch are employed. A light touch operates the switches. The stop switch is interlocked with a solenoid type brake mechanism to assure quick stop.
- **New highly sensible, stable gimbal support tonearm**
Micron-accuracy radial bearings are symmetrically positioned with the axis to provide a unique structure. This new gimbal support system is similar to the one-point-on-the-axis support system in terms of performance, which provides high sensitivity, stability and long service life of the tonearm. Moreover, the arm pipe containing shock absorbing materials, the high density headshell and output cords which use cores of reduced d.c. resistance, greatly improve sound quality.
- **Solid cabinet**
High density fiber board which does not propagate external vibrations is employed to obtain a solid cabinet structure.
- **Newly developed parallel isolators**
Coil spring and rubber are housed in the solid diecast isolator housing to effectively prevent vibrations. The former which permits a reduction in the resonance frequency (fo) and the latter with a lower resonance factor Q, are effectively employed to improve anti-vibration effect and to reduce lateral vibrations. Height adjustment is also possible.

4. "How to Operate"(Names & Functions)

Servomotor Section

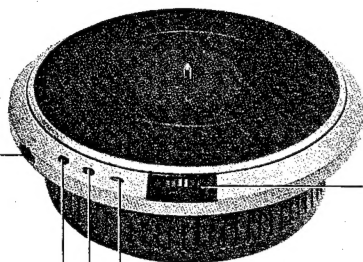
- ### 1. Power Switch

Set this switch to "ON". This switch turns the power on and provides the stop mode, which is obtained when the "Stop" switch (4) is touched in operation. The neon lamp in the window lights.

- ### 3. Window

Stroboscope pattern can be seen in the window. Speed indicator "33" or "45" lamp lights. The stroboscope pattern appears to be stationary to indicate that the correct speed is being obtained.

33-1/3 rpm	"33" lamp lights
45 rpm	"45" lamp lights



- ## 2. Speed select/Start switches

Touch the switch corresponding to the disc you wish to play to rotate the platter.

For 33-1/3 rpm disc Touch the "33"
For 45 rpm disc Touch the "45"

- #### 4. Stop switch

Lightly touch the switch to stop the platter rotation. The platter stops within a half rotation.

Note:

Wet or dusty switches prevent correct operation. Always keep them clean.

Fig. 1

Tonearm Section



- ### 1. Anti-skating knob

The anti-skating mechanism counteracts the centripetal force which pulls the stylus towards the center of the record during play, thereby reducing pressure on the inner walls of the record groove.

- ## 2. Arm lifter lever

Use this lever when you wish to gently lift or lower the tonearm.

Fig. 2

5. Block Diagrams

5-(1) Servo(motor)Control System

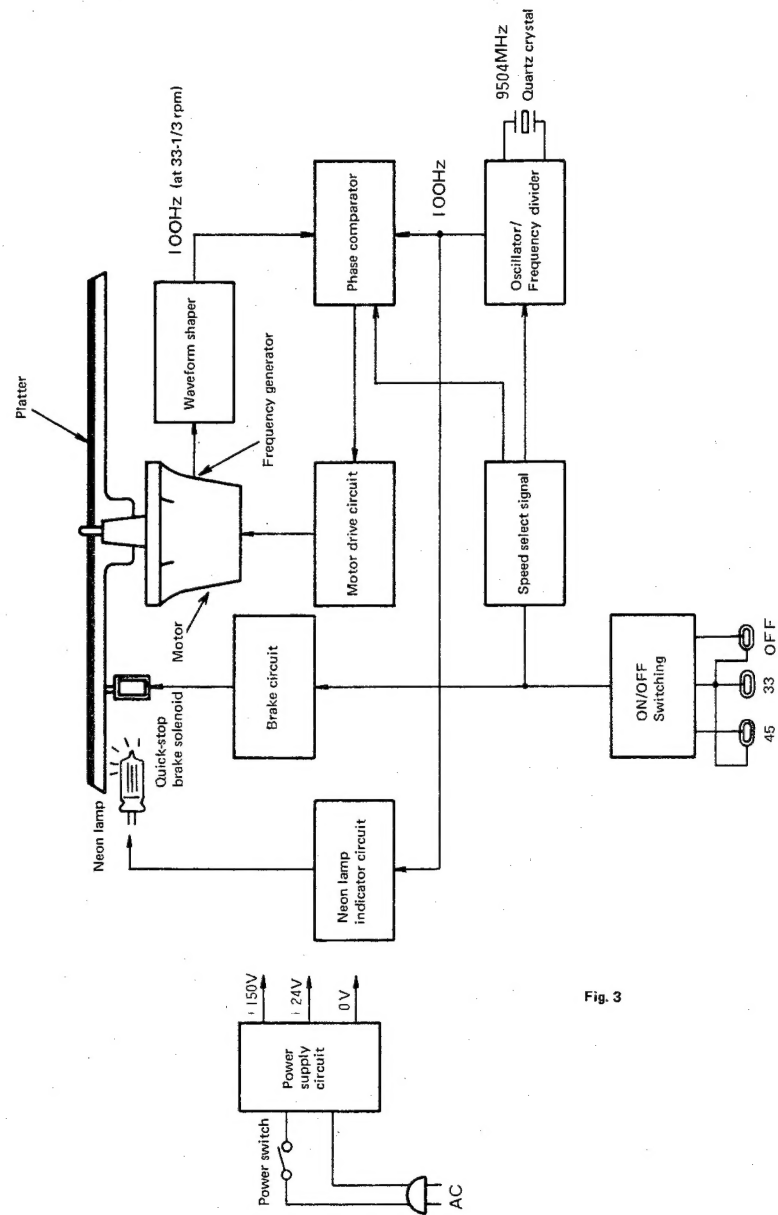


Fig. 3

5-(2) IC802 & IC803

IC802 Block Diagram

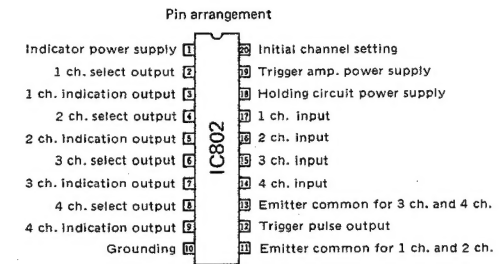


Fig. 4

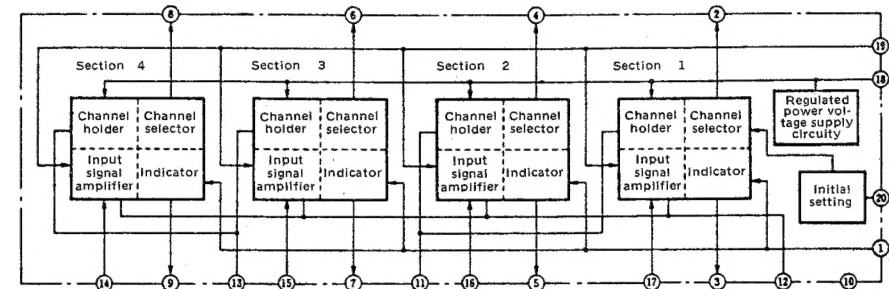


Fig. 5

IC803 Block Diagram

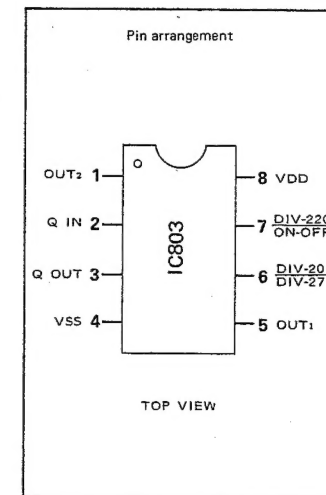


Fig. 6

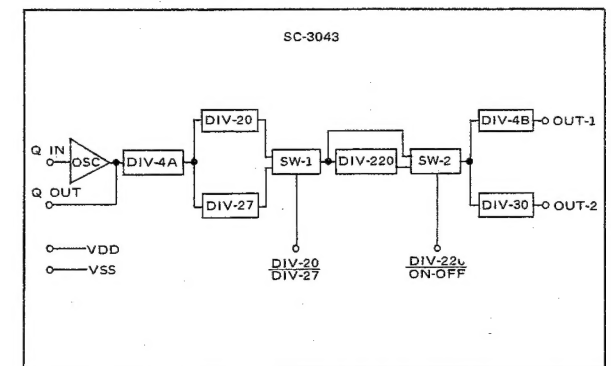
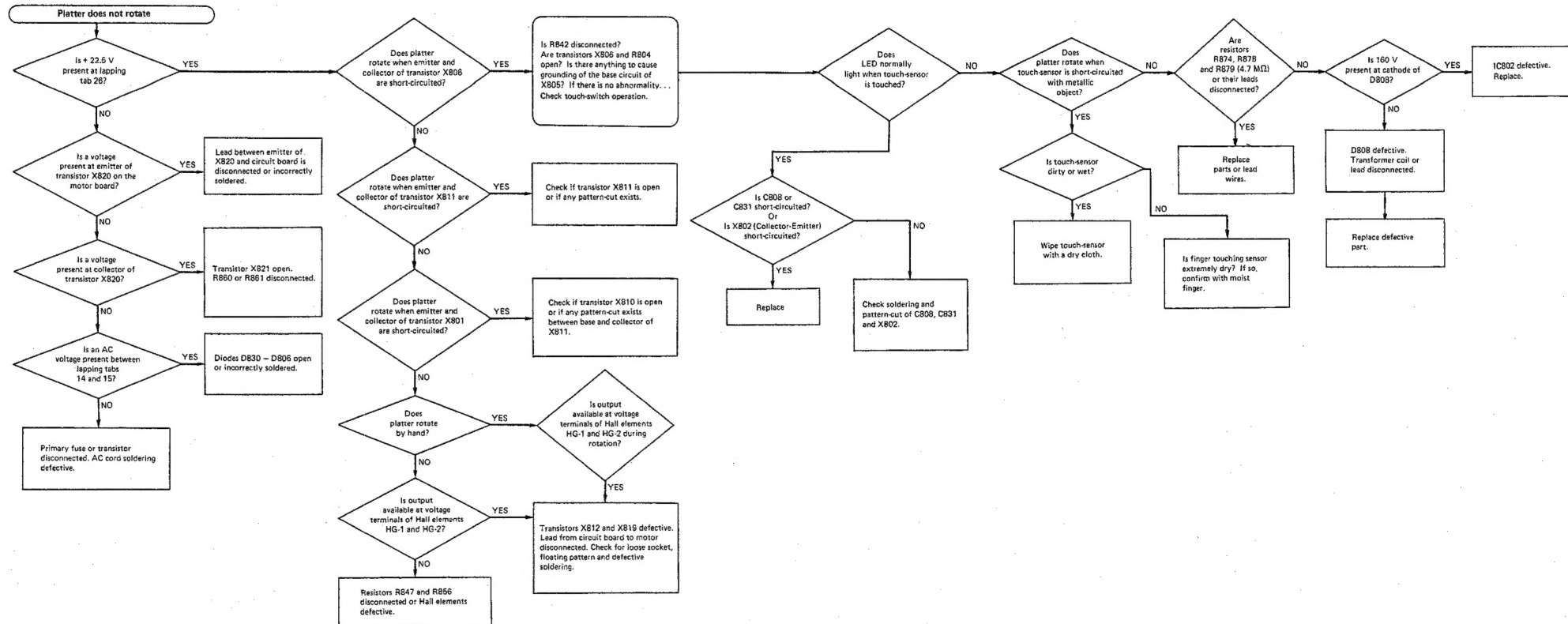


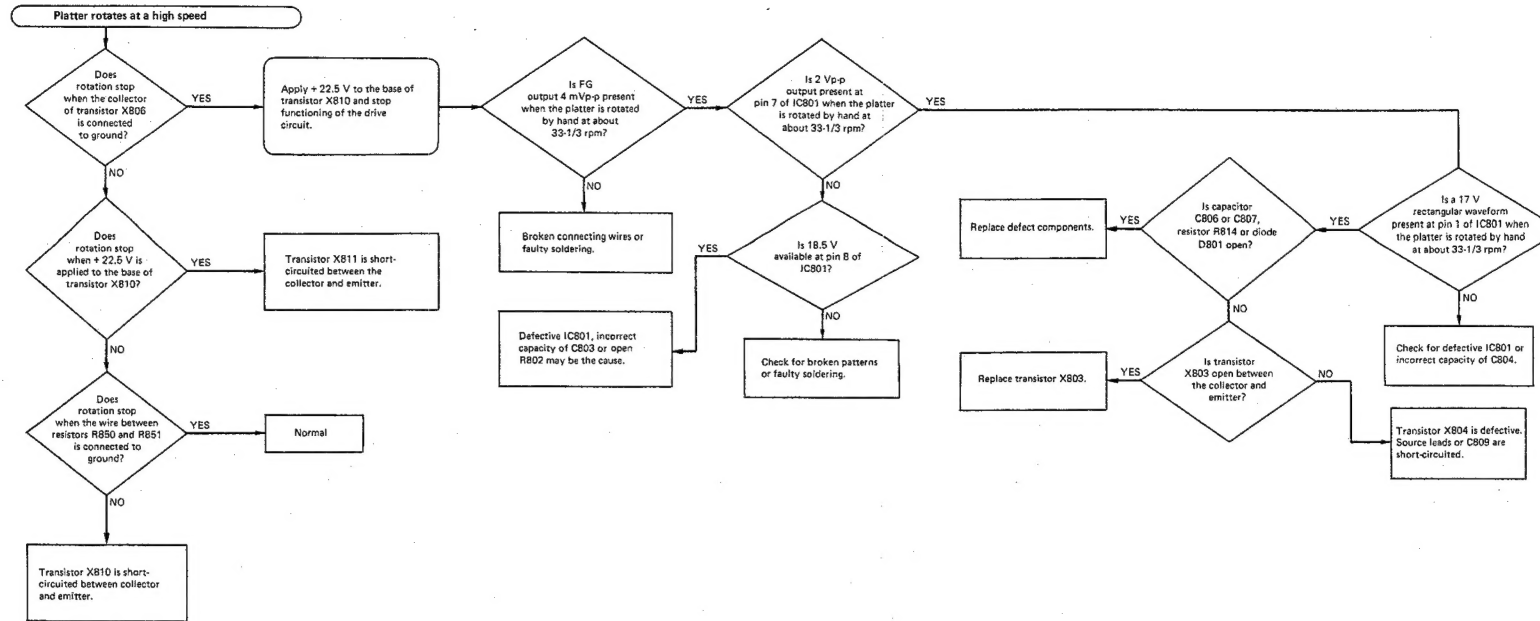
Fig. 7

6. Troubleshooting

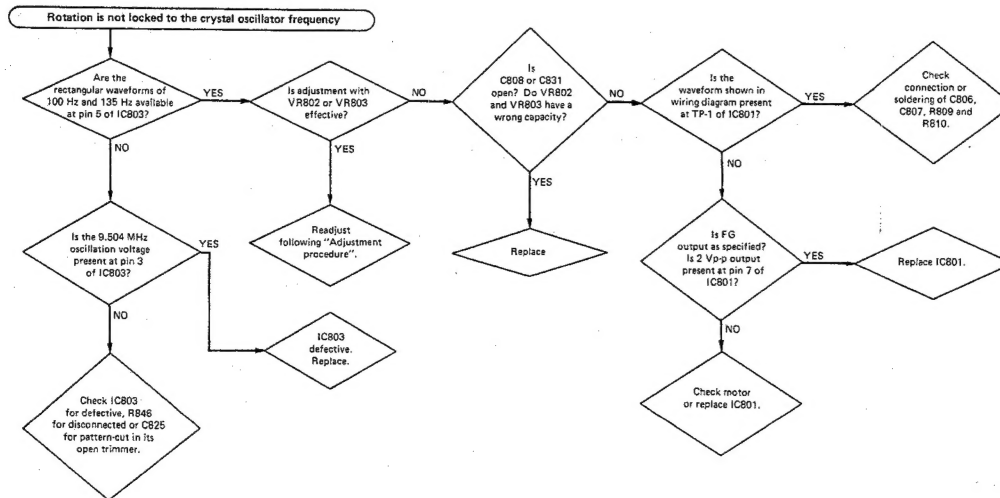
6-(1) Platter does not rotate



6-(2) Platter rotates at a high speed



6-(3) Rotation is not locked to the crystal oscillator frequency



7. Adjustment procedures

Servomotor Section

Precaution

When servicing, do not touch the motor board and connected measuring devices at the same time, since 160 V DC is applied between the motor board and the circuit board ground.

7-(1) Power Supply Voltage Check

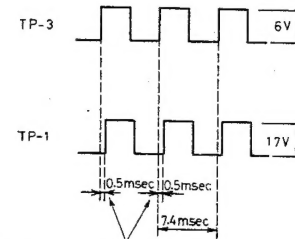
1. Disconnect the motor socket from the circuit board. Set semi-fixed resistors VR801 – 804 to the mid position. Turn the power switch on. Confirm that 22 ± 2 V DC is present at the emitter of transistor X820 on the motor board, and that 17.5 ± 2 V DC is present at TP-4 at the same time.
2. Connect the motor socket to the circuit board. Confirm that the voltage values obtained in 1 above vary less than -1 V at 33-1/3 or 45 rpm when the platter is stopped by hand.
3. Confirm that $160 \text{ V} \pm 5 \text{ V}$ DC is present at the cathode terminal of diode D808 (neon lamp, terminal 9) while the platter is rotating in the steady state.

7-(2) Lock Adjustment

(Place the turntable on a level surface.)

(1) With dual beam oscilloscope

1. Connect the dual beam oscilloscope to TP-1 and TP-3. Obtain a turntable speed of 45 rpm by touching the "45" speed select switch, then adjust semi-fixed resistor VR803 ($22 \text{ k}\Omega$) until the following waveforms are obtained.



Adjust to get a difference of within ± 0.5 msec from TP-3.

Fig. 11

2. Obtain a turntable speed of 33-1/3 rpm by touching the "33" speed select switch, then adjust semi-fixed resistor VR802 ($22 \text{ k}\Omega$) until the difference between TP-3 and TP-1 is within ± 0.5 msec.

(2) With single beam oscilloscope

Connect the composite output of TP-1 and TP-3 to the vertical signal input terminal of the single beam oscilloscope as shown in Fig. 12-A.

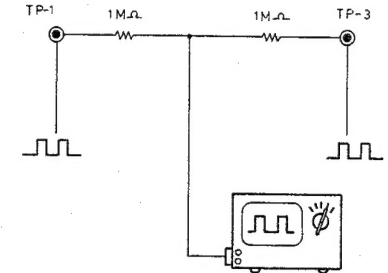
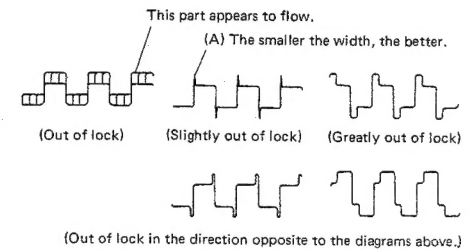


Fig. 12-A

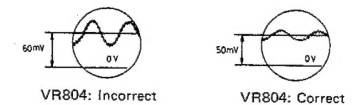


Adjust until the width of the jumping part (glitch) at (A) becomes minimum.

Fig. 12-B

7-(3) Balance Adjustment of Drive Circuit

Connect an oscilloscope to TP-2, set an approx. 0.2 sec/cm sweep speed, then adjust semi-fixed resistor VR804 ($100 \text{ k}\Omega$) until the waveform ripple becomes minimum.



After adjustment, recheck (2) Lock Adjustment on this page. If deviation is noted, readjust.

Fig. 13

7-(4) Brake Mechanism Adjustment

A brake lining is employed to stop the platter. A worn brake lining will result in the platter not stopping quickly or stopping with abnormal noise. If these troubles occur, adjust as described below.

• The platter makes a noisy stop.

1. Brush the friction surface of the brake lining, which contacts the platter, with a brush several times. Refer to Fig. 14.
2. Carefully wipe the inner platter surface, which contacts the brake lining, with a soft cloth (such as gauze) dipped in alcohol.

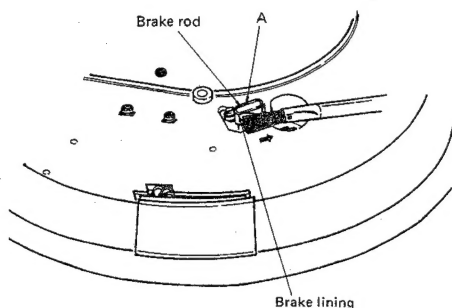


Fig. 14

• The platter does not stop correctly due to a defective brake. (The platter does not stop within one rotation.)

When the brake lining is worn out.

1. Completely remove the brake lining using thinner, then attach a new lining.
2. Remove the paper covering from the adhesive rear side of the new brake lining, then attach the brake lining in the previously attached position.
3. Glue the brake rod to the brake lining at the double lining position (as shown by arrow A in Fig. 14) with rubber cement.

When the solenoid coil is improperly positioned.

1. Fit the brake lining inside the platter (The function is the same as a normal brake). Slightly loosen the 2 solenoid mounting screws, then adjust the solenoid coil position until the clearance between the solenoid coil end and the plunger head is 9 mm. (Refer to Fig. 15.) After the adjustment, be sure to re-tighten the screws firmly (Refer to Fig. 16).

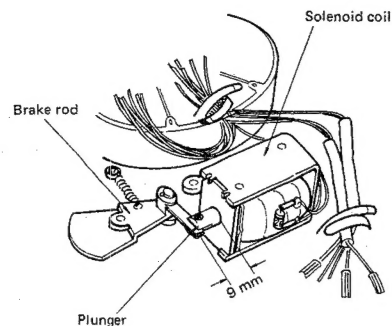


Fig. 15

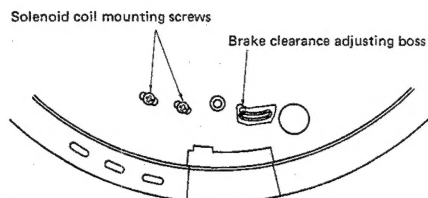


Fig. 16

• How to use the brake clearance adjusting boss. (Refer to Fig. 16)

When replacing the brake rod with a new one, turn the boss fully counterclockwise, then mount new brake rod.

After mounting the brake rod, gradually turn the boss clockwise (This narrows the clearance between the platter and the brake lining) until the contact sound of the brake lining and platter is eliminated when the platter is stopped by touching the stop switch.

Finally, confirm that the brake lining does not contact the platter, while the platter is rotating at the speed 33-1/3 or 45 rpm, by noting the sound and observing the stroboscope.

If the platter contacts the brake lining during rotation, turn the boss counterclockwise to increase the clearance between the brake lining and platter. After replacing the brake rod, be sure to apply a drop of silicone (in the order of million unit) to the part of the motor board stud which contacts the brake rod.

Tonearm Section

7-(5) Tonearm Height Adjustment

Mount the cartridge on the headshell. Loosen the 2 tonearm securing screws with a screwdriver, then adjust the tonearm height until the tonearm is horizontal, with the stylus tip at approximately the same level as the disc surface. Be sure to re-tighten the 2 tonearm securing screws after the adjustment. (No adjustment is necessary for European models which are equipped with the Z-1 S tonearm.

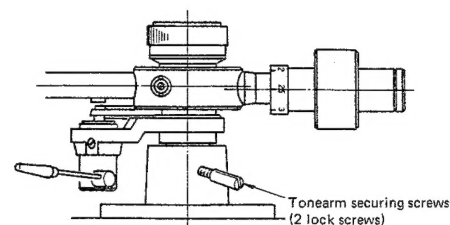


Fig. 17

7-(6) Arm Lifter Height Adjustment

When the tonearm is raised with the arm lifter lever, optimum clearance between the stylus and the disc surface is 8 mm. If no clearance exists between the tonearm and arm lifter during play, proper disc play will not be obtained. With the arm lifter raised, loosen the lifter bracket securing screw with a screwdriver. Adjust the arm lifter height until the clearance between the stylus tip and the disc surface is 8 mm.

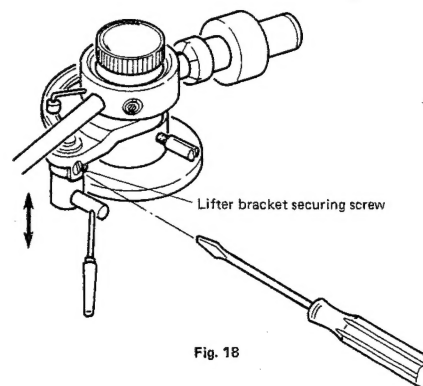


Fig. 18

7-(7) Overhang Adjustment

An overhang indicator convenient for overhang adjustment is provided for the model QL-7.

Fit the overhang indicator onto the turntable spindle with the arrow-shaped end pointing toward the tonearm pivot. Move the tonearm and place the stylus over the overhang indicator. (Be sure, the tonearm is in the up position.) One digit on the overhang indicator represents 1 mm overhang. Slide the cartridge adjusting the overhang until the stylus points to 15 mm (marked by "A" between 10 and 20 mm). Be sure to secure the cartridge to the headshell after the adjustment. Errors within 2 - 3 mm are negligible from the practical point of view.

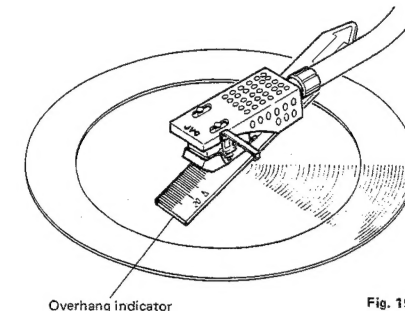


Fig. 19

7-(8) Headshell Angle Adjustment

If the stylus tip is not perpendicular to the surface of the disc, loosen the lock screws on the lower side of the tonearm, with a small screwdriver, then adjust the head shell until it is parallel with the platter. Be sure to re-tighten the screws after the adjustment is completed. For reference purposes, measurement by eye is sufficient.

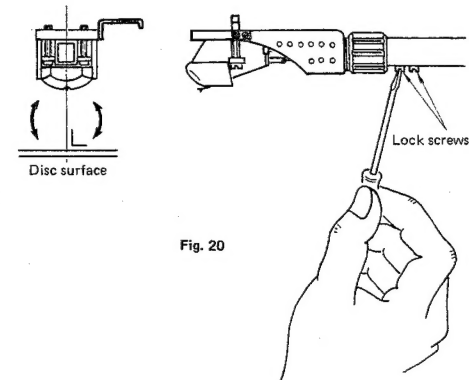
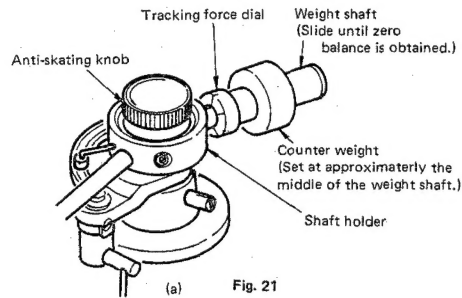


Fig. 20

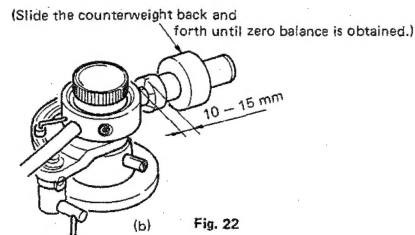
7-(9) Tracking Force Adjustment

Caution: Be careful not to touch the stylus tip with the finger etc., during the adjustment.

1. Set the anti-skating knob to "0". If this is not performed, the tendency for the tonearm to move laterally will make tracking force adjustment difficult. (Refer to "Anti-skating adjustment" in Fig. 23.)
2. Zero balance adjustment
Zero balance can be obtained in two ways:
a. Slide the counterweight back and forth, then set at approximately the middle of the weight shaft. Adjust for zero balance by turning the weight shaft clockwise or counterclockwise. Refer to Fig. 21.



- b. Keep the weight shaft 10 – 15 mm away from the shaft holder, then slide the counterweight back and forth until zero balance is obtained. Refer to Fig. 22.

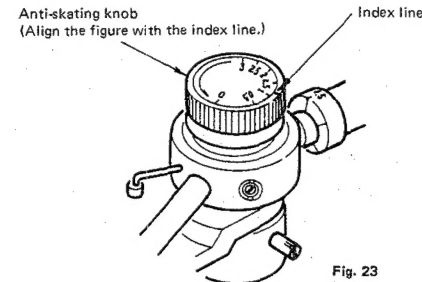


If a heavier cartridge and headshell are employed, it may be impossible to obtain zero balance with the counterweight provided. In this case, use an optional counterweight. (SW-71, for cartridges of 21.5 – 32 g including headshell)

3. Clamp the tonearm on the tonearm rest.
4. Hold the counterweight motionless, then turn the dial only until the "0" mark on the dial is aligned with the index line on the shaft.
5. Turn the weight shaft counterclockwise, as viewed from the front of the tonearm, while exercising care not to move the counterweight. Align the figure with the index line according to the cartridge employed. Figures on the dial indicate the tracking force in grams.

7-(10) Anti-skating Adjustment

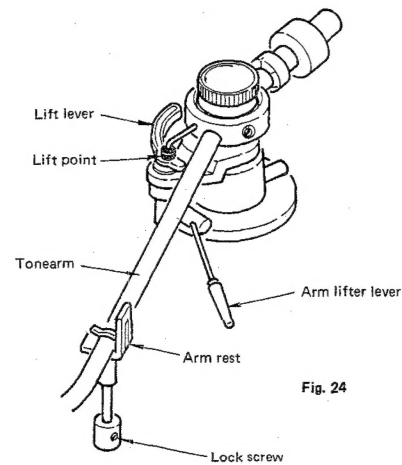
Anti-skating adjustment is required whenever tracking force adjustment is performed. Optimum anti-skating force is obtained by aligning the figure corresponding to that of the tracking force with the index line.



7-(11) Arm-rest Height Adjustment

Adjust the arm-rest height until the tonearm is horizontal when the tonearm clamped on the rest. Be sure to retighten the arm-rest securing screw after the adjustment.

Note: Confirm that the arm lift point does not touch the lifter arm when the tonearm is clamped on the rest and the arm lifter lever is raised.

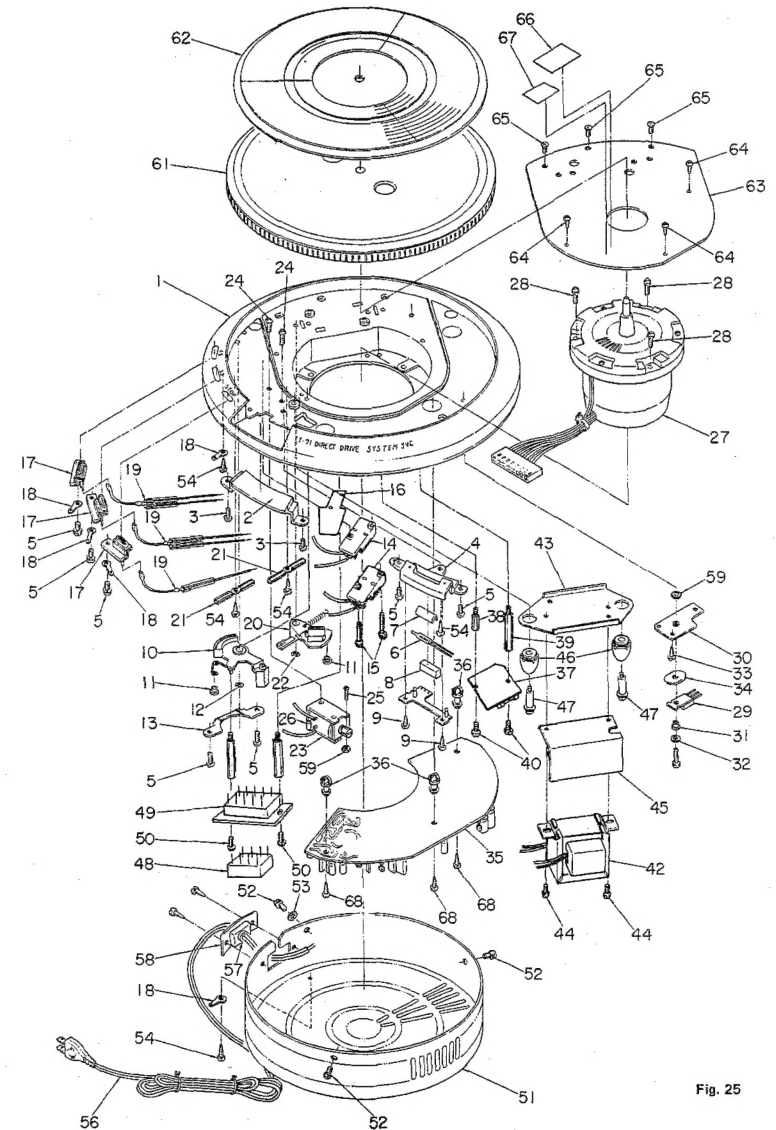


8. Lubrication

The direct drive motor employed in the unit does not require the lubrication.

9. Exploded Views and Parts List

9-(1) Servomotor Ass'y



Item No.	Part Number	Description
1	E10138-002	Motor board ass'y
2	E34762-001	Window
3	LPSP3008ZS	Screw
4	E34763-001	Lamp base
5	LPSP3006ZS	Screw
6	QLN3104-002	Neon lamp
7	E61402-001	Lamp mask
8	E61403-001	Lamp holder
9	SBSP3006Z	Tapping screw
10	E61404-002	Switch lever ass'y
11	E34764-002 E60790-001 E60912-001 E60791-001 RDS2000F	Switch lever Rubber tube Speed nut Spring Stopper
12	REE3000X	E-shaped ring
13	E34765-001	Cover
14	See page 15.	Micro switch
15	See page 15.	Screw
16	See page 15.	Plastic screw
17	See page 15.	Insulator sheet
18	E34766-001	Switch ass'y
19	52868-3 QRD141J-475	Terminal Carbon resistor (4.7 M Ω /1/4 W)
20	E61407-001 E34768-001 E60790-001 E61408-001 E61410-001	Brake lever ass'y Brake lever Rubber tube Brake lining Spring
21	E50670-005	Wire clamp
22	REE5000	E-shaped ring
23	E61409-001	DC solenoid
24	LPSP3006ZS	Screw (Use specified screws only.)
25	LPSP3012ZS	"
26	SIB01-02	Silicon diode
27	See page 15.	Hall direct drive motor
28	LPSP4012ZS	Screw
29	2SD313V (D,E)	Silicon transistor (Pc: 30 W, ft: 8 MHz)
30	E61466-002	Heat sink
31	E41541-21	Bushing
32	WSS3000N	Washer
33	SBSB3008Z	Tapping screw
34	IS-313	Insulation sheet
35	See page 15.	Servo control printed circuit board ass'y
36	E49946-002	P.C. board holder

Item No.	Part Number	Description
37	See page 15.	Power supply
38	E61602-001	P.C. board ass'y
39	E61602-002	Stud
40	LPSP3008ZS	Screw
41	E33754-001	Tie band
42	See page 15.	Power transformer
43	E34769-002	Mount plate
44	LPSP4006ZS	Screw (Use specified screws only.)
45	E34900-002	Shield cover
46	E49631-003	Rubber bushing
47	E49633-001	Motor holder
48	See page 15.	Voltage Select plug
49	See page 15.	Voltage Select socket
50	LPSP3008MS	Screw
51	E21896-004	Cover
52	SDSP3006NS	Screw
53	WBS3000N	Washer
54	SBSB3008N	Tapping screw
55	E49925-002	Earth label
56	See page 15.	Power cord with plug
57	See page 15.	Power cord without plug
58	QHS3876-162 E34197-001	Cord stopper Bracket
59	NTS3000ZS	Nut
60	E60965-001BS	Warning label
61	E22193-001	Platter
62	See page 15.	Turntable covering
63	E34770-001	Shield cover
64	SBSB3008M	Tapping screw
65	SSSB3008MS	Screw
66	E61651-002	Caution label
67	E48199-001	"
68	GBSB3008N	Tapping screw

Parts List with Specified Numbers for Designated Areas

Item No.	Description	For U.S.A. & Canada	For Europe	For U.K.	For Australia	For U.S. Military Market & Other Countries
14	Micro Switch	QSM1V01-018	QSM1V01-022	QSM1V01-022BS	QSM1V01-022	QSM1V01-018
15	Screw	LPSP3014ZS	—	—	—	LPSP3014ZS
15	Plastic Screw	—	SPKP3015S	SPKP3025S	SPKP3015S	—
16	Insulator Sheet	—	E61603-001	E61603-001	E61603-001	—
27	Hall Direct Drive Motor	M932B	M932A	M932A	M932A	M932A
35	Servo Control P.C. Board Ass'y	TXX-38B	TXX-38C	TXX-38C	TXX-38C	TXX-38C
37	Power Supply P.C. Board Ass'y	TSC-80A (U.S.A.) TSC-80B (Canada)	TSC-80D	TSC-80E	TSC-80D	TSC-80C
42	Power Transformer	E03032-25B	E03032-25D	E03032-25DBS	E03032-25D	E03032-25C
48	Voltage Select Plug	—	—	—	—	E03676-001
49	Voltage Select Socket	—	—	—	—	E03676-002
56	Power Cord with Plug	QMP1200-244	QMP3910-244	QMP9017-007BS (without Plug)	QMP2500-200	QMP1200-244
62	Turntable Covering	E22375-002	E22375-001	E22375-001	E22375-001	E22375-001

9-(2) Tonearm Ass'y

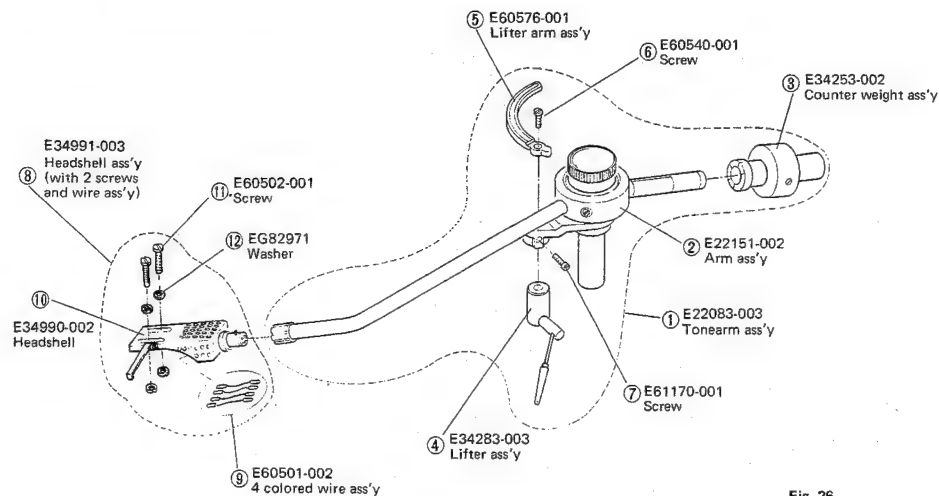


Fig. 26

Item No.	Description	For U.S.A. & Canada	For Europe	For U.K.	For Australia	For U.S. Military Market & Other Countries
	Tonearm Ass'y (without cartridge & stylus)	ARM-617 (with cartridge & stylus)	MP-175S (with cartridge & stylus)	ARM-517	ARM-517	ARM-517
	Cartridge	—	MP-1025	—	—	—
	Stylus	—	DT-Z1TE	—	—	—

9-(3) Turntable Baseboard(Cabinet) Ass'y

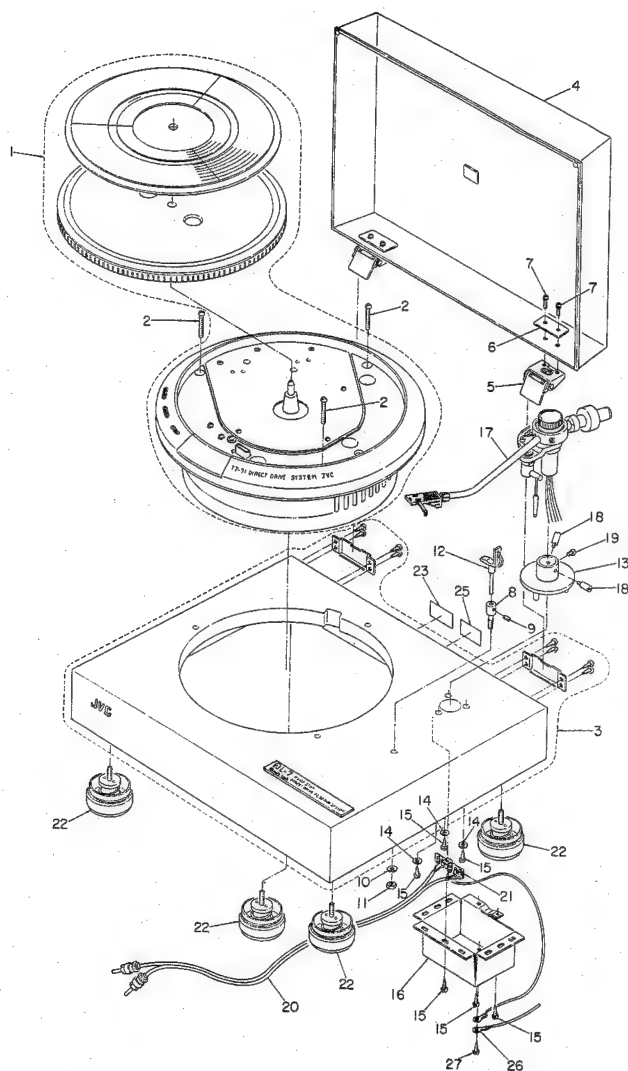


Fig. 27

Parts List

Item No.	Part Number	Description
1	See table below.	Turntable ass'y
2	MSSP4125Z	Wooden screw
3	See table below.	Wooden cabinet ass'y
	E61730-001	Mark
	E61757-001	"
	EG30021-3	Lock plate
4	SBSA3012M	Tapping screw
	ED20946-005	Dust cover ass'y
5	EG30020-002	Hinge ass'y
6	E61121-001	Plate
7	SDSP4008RS	Screw
8	E48808-005	Rest stand
9	TFB3004NS	Set screw
10	WBS6000N	Washer
11	NTS6000Z	Nut
12	E60741-001	Rest ass'y
13	E34775-001	Tonearm base
14	Q03091-105	Washer
15	SBSA3012Z	Screw
16	E34772-002	Shield cover

Item No.	Part Number	Description
17	See table below.	Tonearm ass'y (without cartridge)
	See table below.	Tonearm ass'y (with cartridge)
18	E61144-001	Screw
19	SPSP2604N	"
20	E03700-001	Signal cord ass'y
21	QML1010-051	Lug strip ass'y
22	See table below.	Foot ass'y
23	See table below.	Rating label
24	SBSA3008N	Tapping screw
25	G41297	Sheet paper
26	52868-3	Terminal
27	SBSB3008Z	Tapping screw

Parts List with Specified Numbers for Designated Areas

Item No.	Description	For U.S.A. & Canada	For Europe	For U.K.	For Australia	For U.S. Military Market & Other Countries
1	Turntable Ass'y	TT-71EJ (U.S.A.) TT-71EC (Canada)	TT-71EE	TT-71EBS	TT-71EA	TT-71EP (U.S. Military Market) TT-71EU (Other Countries) ED92707 (Black)
3	Wooden Cabinet Ass'y	ED92707 (Black)	ED92707 (Black)	ED92714 (Walnut)	ED92707 (Black)	ED92707 (Black)
17	Tonearm Ass'y (without Cartridge & Stylus)	ARM-517	MP-175S (with Cartridge & Stylus)	ARM-517	ARM-517	ARM-517
	Cartridge	—	MP-1025	—	—	—
	Stylus	—	DT-Z1TE	—	—	—
22	Foot Ass'y	E34773-003	E34773-001	E34773-001	E34773-001	E34773-001
23	Rating Label	E47330-339J	E47330-341E	E47330-343BS	E47330-342A	E47330-340U, P

10. Connection Diagram of TXX-38 P.C.Board Ass'y

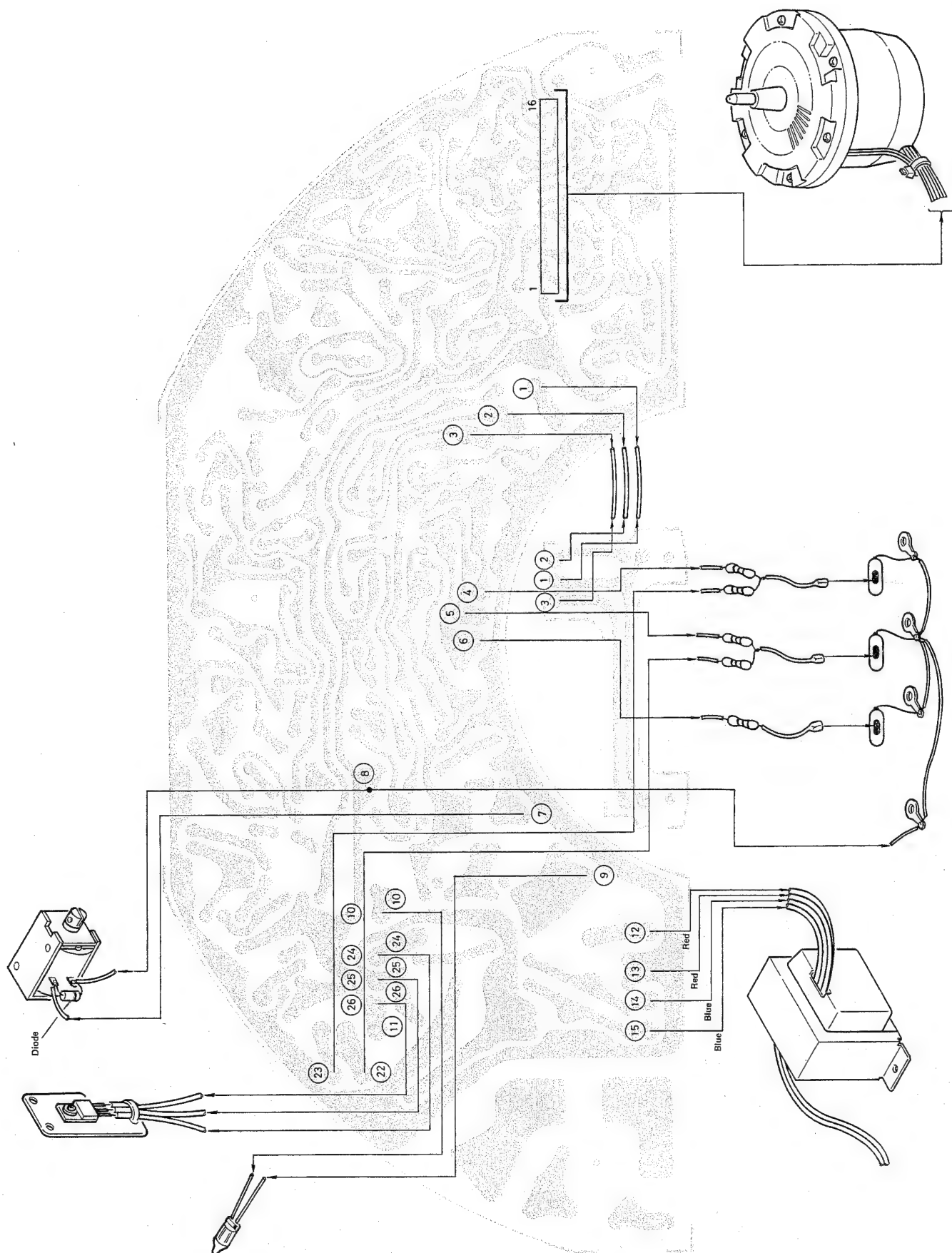
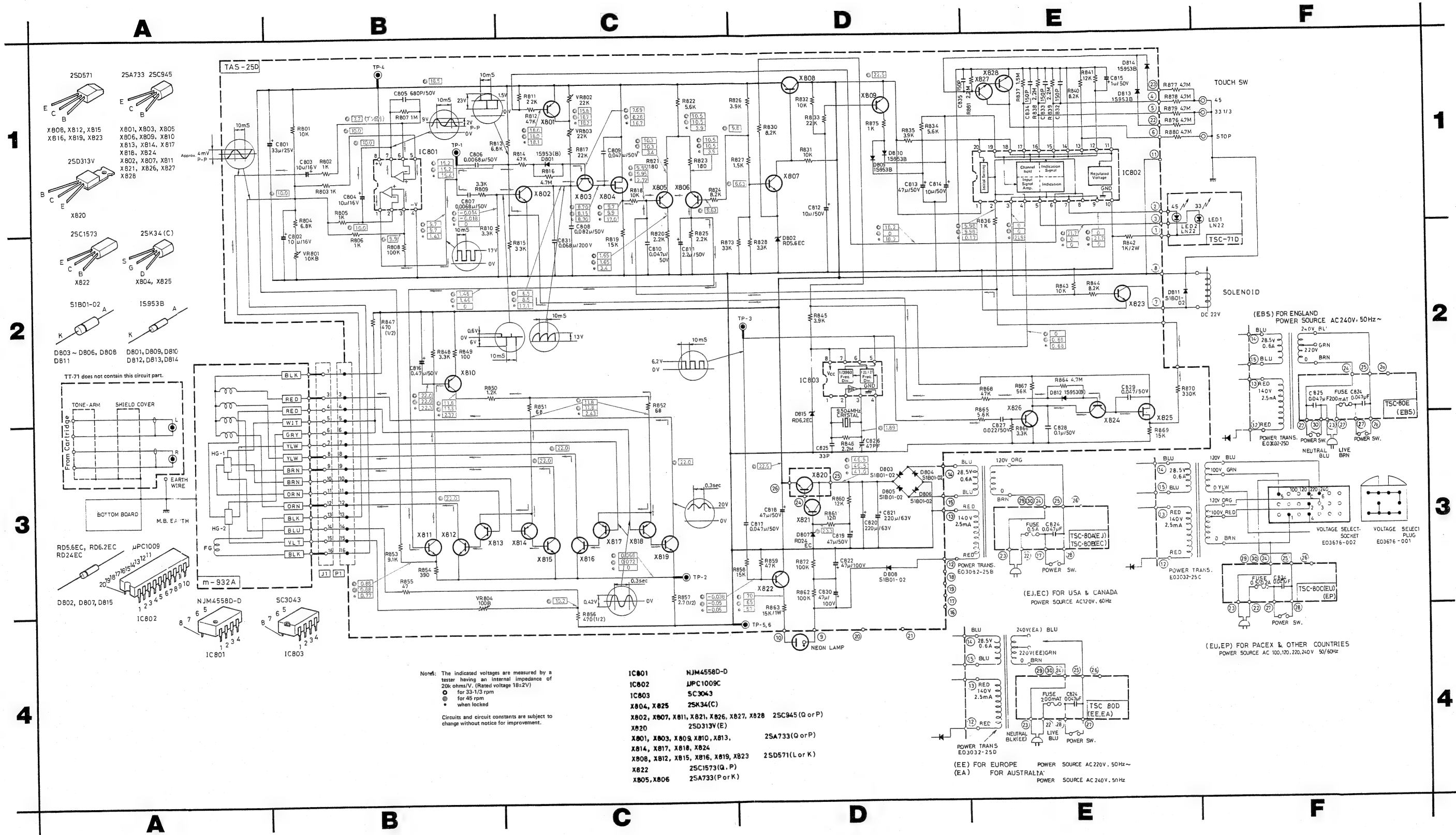


Fig. 28

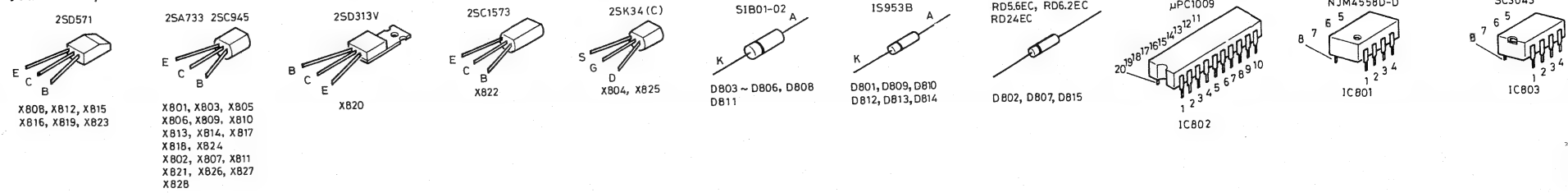
TXX-38B Schematic Diagram



Circuit Board Ass'y Locations

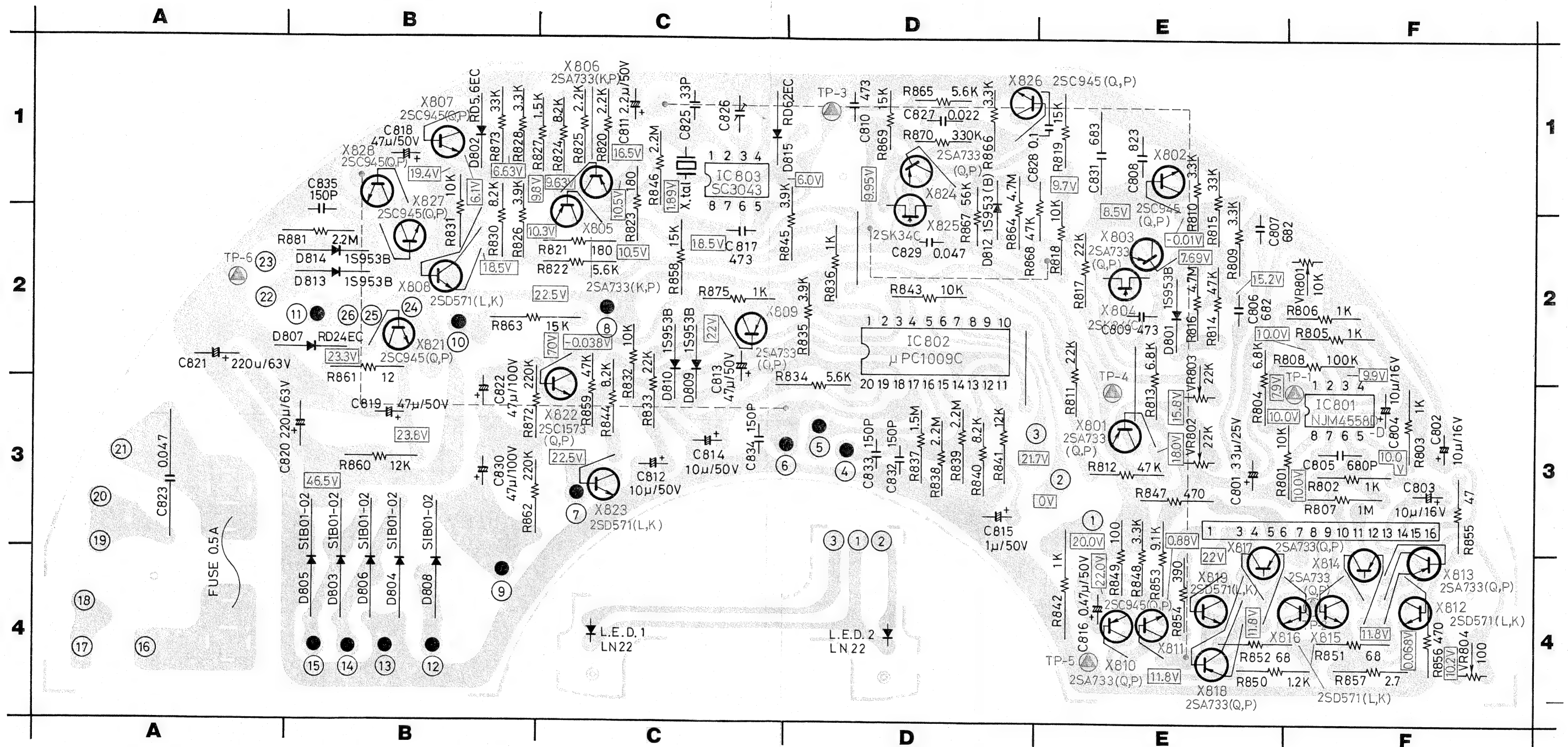
P.C. Board Ass'y	Description	Page
TXX-38B (or C)	Servo Control P.C. Board Ass'y	20
TSC-80A (to E)	Power Supply P.C. Board Ass'y	24

Transistor, IC and Diode Lead Identification



11. Printed Circuit Board Ass'y and Parts List

11-(1) TXX-38B(or C) Servo Control P.C. Board Ass'y



Note : This assembly varies according to the area where the unit is sold.

For U.S.A. & Canada	For Europe	For U.K.	For Australia	For U.S. Military Market & Other Countries
TXX-38B	TXX-38C	TXX-38C	TXX-38C	TXX-38C

Transistors

Item No.	Part Number	Rating		Description	Maker
		Pc	fT		
X801	2SA733 (P,Q)	250 mW	180 MHz	Silicon	NEC
X802	2SC945 (P,Q)	"	250 MHz	"	"
X803	2SA733 (P,Q)	"	180 MHz	"	"
X804	2SK34 (C)			F.E.T.	Mitsubishi
X805	2SA733 (P,K)	250 mW	180 MHz	Silicon	"
X806	2SA733 (P,K)	"	"	"	"
X807	2SC945 (P,Q)	"	250 MHz	"	NEC
X808	2SD571 (L,K)	800 mW	110 MHz	"	"
X809	2SA733 (P,Q)	250 mW	180 MHz	"	Mitsubishi
X810	2SA733 (P,Q)	"	"	"	"
X811	2SC945 (P,Q)	"	250 MHz	"	NEC
X812	2SD571 (L,K)	800 mW	110 MHz	"	"
X813	2SA733 (P,Q)	250 mW	180 MHz	"	"
X814	2SA733 (P,Q)	"	"	"	"
X815	2SD571 (L,K)	800 mW	110 MHz	"	"
X816	2SD571 (L,K)	"	"	"	"
X817	2SA733 (P,Q)	250 mW	180 MHz	"	"
X818	2SA733 (P,Q)	"	"	"	"
X819	2SD571 (L,K)	800 mW	110 MHz	"	"
X820	2SD313V	30 W	8 MHz	"	Sanyo
X821	2SC945 (P,Q)	250 mW	250 MHz	"	NEC
X822	2SC1573 (Q)	600 mW	80 MHz	"	Matsushita
X823	2SD571 (L,K)	800 mW	110 MHz	"	NEC
X824	2SA733 (P,Q)	250 mW	180 MHz	"	"
X825	2SK34 (C)			F.E.T.	Mitsubishi
X826	2SC945 (P,Q)	250 mW	250 MHz	Silicon	NEC
X827	2SC945 (P,Q)	"	"	"	"
X828	2SC945 (P,Q)	"	"	"	"

Integrated Circuits

Item No.	Part Number	Rating	Description	Maker
IC801	NJM4558D-D		I.C.	Shin-nihon-musen
IC802	μPC1009C		"	NEC
IC803	SC3043		"	Nihon Precision Circuits

Diodes

Item No.	Part Number	Rating		Description	Maker
D801	IS953B		5.6 V	Silicon	NEC
D802	RD5.6EC			Zener	Fuji Denki
D803	SIB01-02			Silicon	"
D804	SIB01-02			"	"
D805	SIB01-02			"	"
D806	SIB01-02		24 V	"	"
D807	RD24EC			Zener	"
D808	SIB01-02			Silicon	"
D809	IS953B			"	NEC
D810	IS953B			"	"
D811	IS953B			"	"
D812	IS953B			"	"
D813	IS953B			"	"
D814	IS953B			"	"
LED1	LN-22			LED	Matsushita
LED2	LN-22			"	"

Capacitors				
Item No.	Part Number	Rating		Description
C801	QEW41EA-336	33 μ F	25 V	Electrolytic
C802	QEW41CA-106	10 μ F	16 V	"
C803	QEW41CA-106	"	"	"
C804	QEW41CA-106	"	"	"
C805	QCS11HJ-681	680 pF	50 V	Ceramic
C806	QFM41HK-682	6800 pF	"	Mylar
C807	QFM41HK-682	"	"	"
C808	QFM41HK-823	0.082 μ F	"	"
C809	QFM41HK-473	0.047 μ F	"	"
C810	QFM41HK-473	"	"	"
C811	QEW41HK-225	2.2 μ F	50 V	Electrolytic
C812	QEW41HA-106	10 μ F	"	"
C813	QEW41HA-476	47 μ F	"	"
C814	QEW41HA-106	10 μ F	"	"
C815	QEW41HA-105	1 μ F	"	"
C816	QEW41HA-474	0.47 μ F	"	"
C817	QFM41HK-473	0.047 μ F	"	Mylar
C818	QEW41HA-476	47 μ F	50 V	Electrolytic
C819	QEW41HA-476	"	"	"
C820	QEW41JA-227	220 μ F	63 V	"
C821	QEW41JA-227	"	"	"
C822	QEW42AA-476	47 μ F	100 V	"
C825	QCT05UJ-330	33 pF	"	Ceramic
C826	QAT3001-006	47 pF	"	Trimmer
C827	QFM41HK-223	0.022 μ F	50 V	Mylar
C828	QFM41HK-104	0.1 μ F	"	"
C829	QFM41HK-473	0.047 μ F	"	"
C830	QEW42AA-476	47 μ F	100 V	Electrolytic
C831	QFP32DK-683	0.068 μ F	"	Polypropyle
C832	QCS11HJ-151	150 pF	50 V	Ceramic
C833	QCS11HJ-151	"	"	"
C834	QCS11HJ-151	"	"	"
C835	QCS11HJ-151	"	"	"

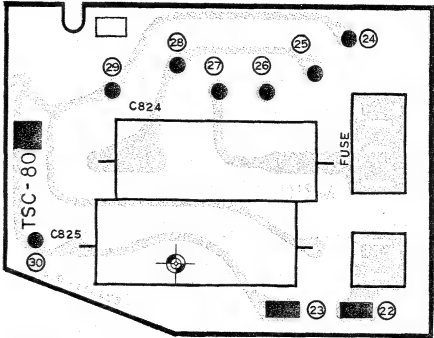
Resistors				
Item No.	Part Number	Rating		Description
R801	QRD141J-103	10 k Ω	1/4 W	Carbon
R802	QRD141J-102	1 k Ω	"	"
R803	QRD141J-102	"	"	"
R804	QRD141J-682	6.8 k Ω	"	"
R805	QRD141J-102	1 k Ω	"	"
R806	QRD141J-102	"	"	"
R807	QRD141J-105	1 M Ω	"	"
R808	QRD141J-104	100 k Ω	"	"
R809	QRD141J-332	3.3 k Ω	"	"
R810	QRD141J-332	"	"	"
R811	QRD141J-223	22 k Ω	"	"
R812	QRD141J-473	47 k Ω	"	"
R813	QRD141J-682	6.8 k Ω	"	"
R814	QRD141J-473	47 k Ω	"	"
R815	QRD141J-333	33 k Ω	"	"
R816	QRD141J-475	4.7 M Ω	"	"
R817	QRD141J-223	22 k Ω	"	"
R818	QRD141J-103	10 k Ω	"	"
R819	QRD141J-153	15 k Ω	"	"
R820	QRD141J-222	2.2 k Ω	"	"
R821	QRD141J-181	180 Ω	"	"
R822	QRD141J-562	5.6 k Ω	"	"
R823	QRD141J-181	180 Ω	"	"
R824	QRD141J-822	8.2 k Ω	"	"
R825	QRD141J-222	2.2 k Ω	"	"

Resistors				
Item No.	Part Number	Rating		Description
R826	QRD141J-392	3.9 k Ω	1/4 W	Carbon
R827	QRD141J-152	1.5 k Ω	"	"
R828	QRD141J-332	3.3 k Ω	"	"
R829				
R830	QRD141J-822	8.2 k Ω	1/4 W	Carbon
R831	QRD141J-103	10 k Ω	"	"
R832	QRD141J-103	"	"	"
R833	QRD141J-223	22 k Ω	"	"
R834	QRD141J-562	5.6 k Ω	"	"
R835	QRD141J-392	3.9 k Ω	"	"
R836	QRD141J-102	1 k Ω	"	"
R837	QRD141J-155	1.5 M Ω	"	"
R838	QRD141J-225	2.2 M Ω	"	"
R839	QRD141J-225	"	"	"
R840	QRD141J-822	8.2 k Ω	"	"
R841	QRD141J-123	12 k Ω	"	"
R842	QRG027J-102	1 k Ω	2 W	Uninflammable O.M.
R843	QRD141J-103	10 k Ω	1/4 W	Carbon
R844	QRD141J-822	8.2 k Ω	"	"
R845	QRD141J-392	3.9 k Ω	"	"
R846	QRD141J-225	2.2 M Ω	"	"
R847	QRG129J-471	470 Ω	1/2 W	Uninflammable O.M.
R848	QRD141J-332	3.3 k Ω	1/4 W	Carbon
R849	QRD141J-101	100 Ω	"	"
R850	QRD141J-122	1.2 k Ω	"	"
R851	QRD141J-680	68 Ω	"	"
R852	QRD141J-680	"	"	"
R853	QRD181J-912	9.1 k Ω	1/8 W	"
R854	QRD141J-391	390 Ω	1/4 W	"
R855	QRD141J-470	47 Ω	"	"
R856	QRG129J-471	470 Ω	1/2 W	Uninflammable O.M.
R857	QRX129J-2R7	2.7 Ω	"	"
R858	QRD141J-153	15 k Ω	1/4 W	Carbon
R859	QRD141J-473	47 k Ω	"	"
R860	QRD141J-123	12 k Ω	"	"
R861	QRD141J-120	12 Ω	"	"
R862	QRD141J-104	100 k Ω	"	"
R863	QRG017J-153	15 k Ω	1 W	Uninflammable O.M.
R864	QRD141J-475	4.7 M Ω	1/4 W	Carbon
R865	QRD181J-562	5.6 k Ω	1/8 W	"
R866	QRD181J-332	3.3 k Ω	"	"
R867	QRD181J-563	56 k Ω	"	"
R868	QRD181J-473	47 k Ω	"	"
R869	QRD181J-153	15 k Ω	"	"
R870	QRD181J-334	330 k Ω	"	"
R872	QRD141J-104	100 k Ω	1/4 W	"
R873	QRD141J-333	33 k Ω	"	"
R875	QRD141J-102	1 k Ω	"	"
R881	QRD141J-225	2.2 M Ω	"	"
VR801	QVP4A0B-103	10 k Ω		Variable
VR802	QVZ3501-223	22 k Ω		"
VR803	QVZ3501-223	22 k Ω		"
VR804	QVP4A0B-101	100 Ω		"

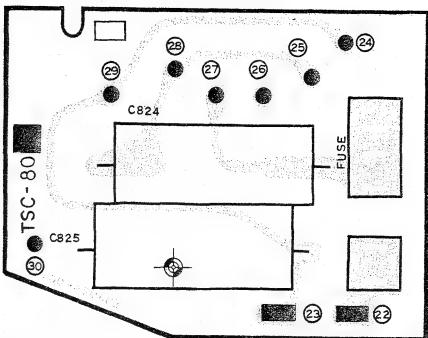
Others			
Item No.	Part Number	Rating	Description
	E04300-001	9.504 MHz	Crystal
	E03686-16A	15 pins	Plug
	E60448-001		L.E.D. Spacer
	E43727-002		Tab

11-(2) TSC-80A(to E) Power Supply P.C. Board Ass'y

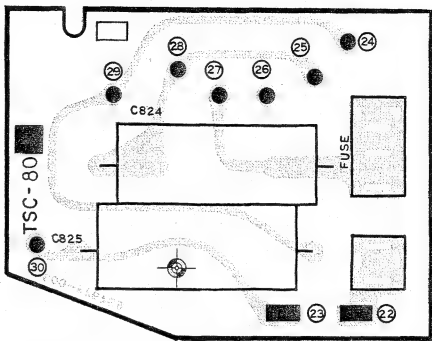
Note: The assembly varies according to the area where the unit is sold. Refer to the table shown below.



Applies to: TSC-80A (for U.S.A.)
TSC-80B (for Canada)



Applies to: TSC-80C (for U.S. Military Market and Other Countries)
TSC-80D (for Australia and Europe)



Applies to: TSC-80E (for U.K.)

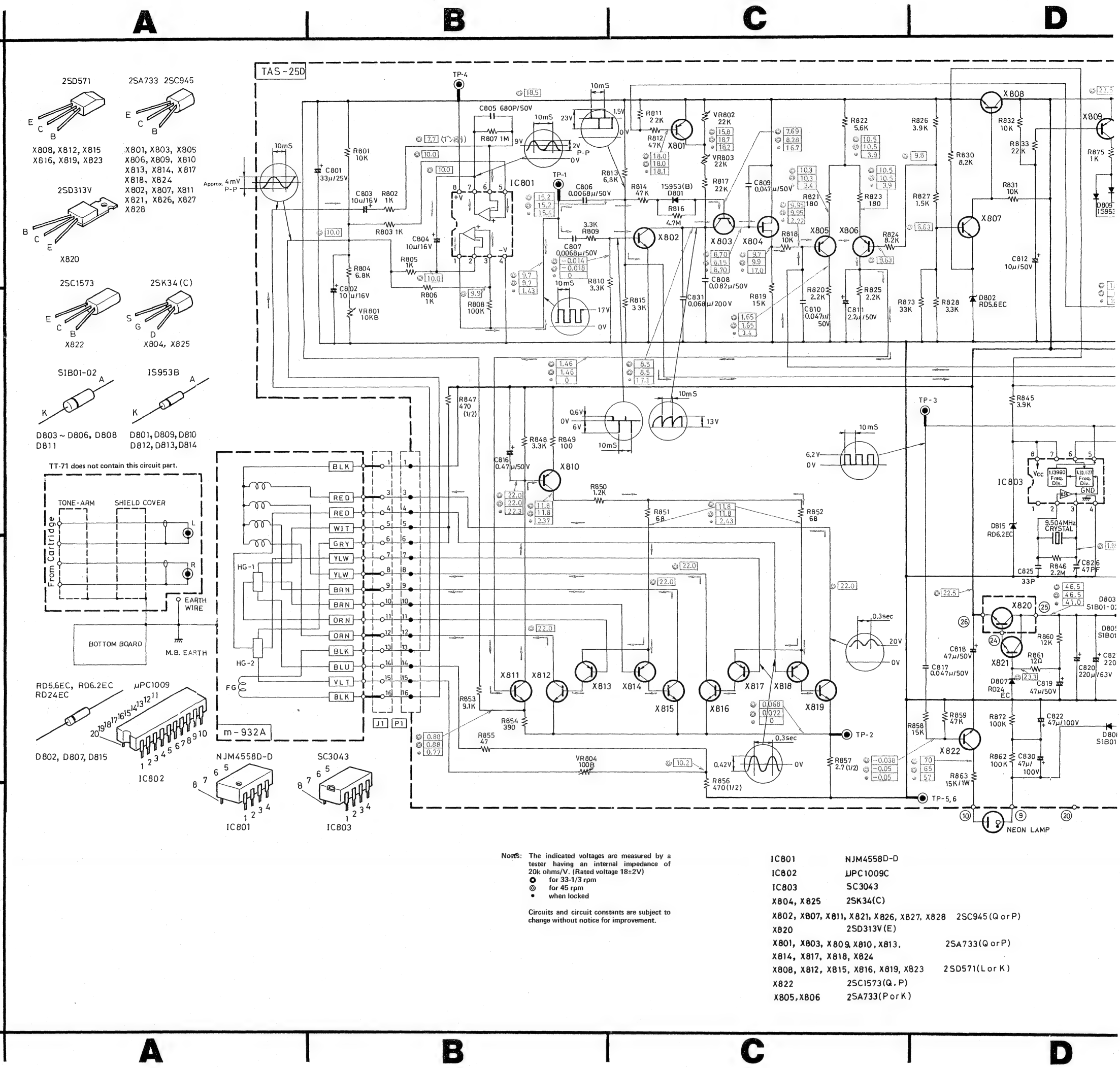
Capacitors (Item No. C824 & C825)

P.C. Board Ass'y	Designated Areas	Part Number	Rating		Description
TSC-80A	for U.S.A.	QFM72BM-473	0.047 μ F	AC 125 V	Mylar
TSC-80B	for Canada	QFM72BM-473	"	"	"
TSC-80C	for U.S. Military Market and Other Countries	QFH53AM-473	"	AC 1 kV	"
TSC-80D	for Europe and Australia	QFZ9007-473	"	AC 450 V	"
TSC-80E	for U.K.	QFZ9007-473BS	"	"	"

Others

Description	for U.S.A. and Canada	for Europe and Australia	for U.K.	for U.S. Military and Other Countries
Fuse Clip	E45524-001	E48965-002	E48965-002	E45524-001
Tab (Power Cord)	E40130-001	E40130-001	E40130-001	E40130-001
Fuse Label	E61378-014	E61381-013	E61381-013BS	E45314-001
Fuse	QMF61U2-R50 (0.5A)	QMF51A2-R20 (0.2AT)	QMF51A2-R20 (0.2AT)	QMF61U2-R50 (0.5A/AC 120 V) or QMF61U2-R20 (0.2A/AC 240 V)

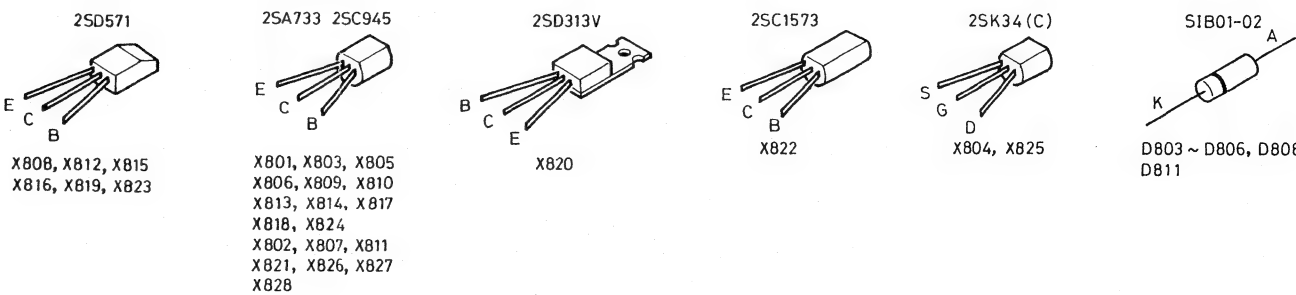
12. QL-7 Schematic Diagram

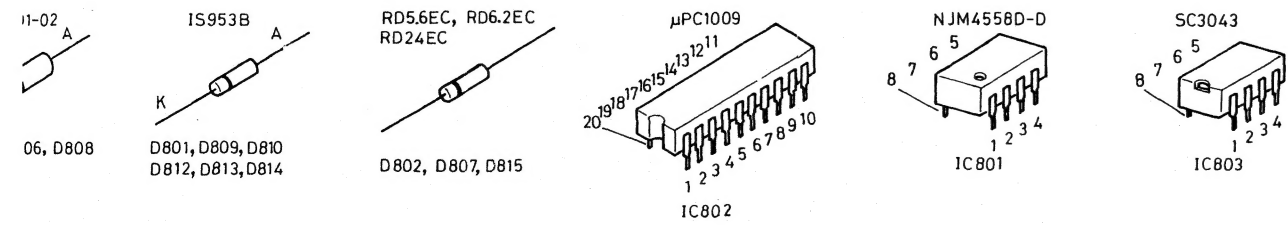
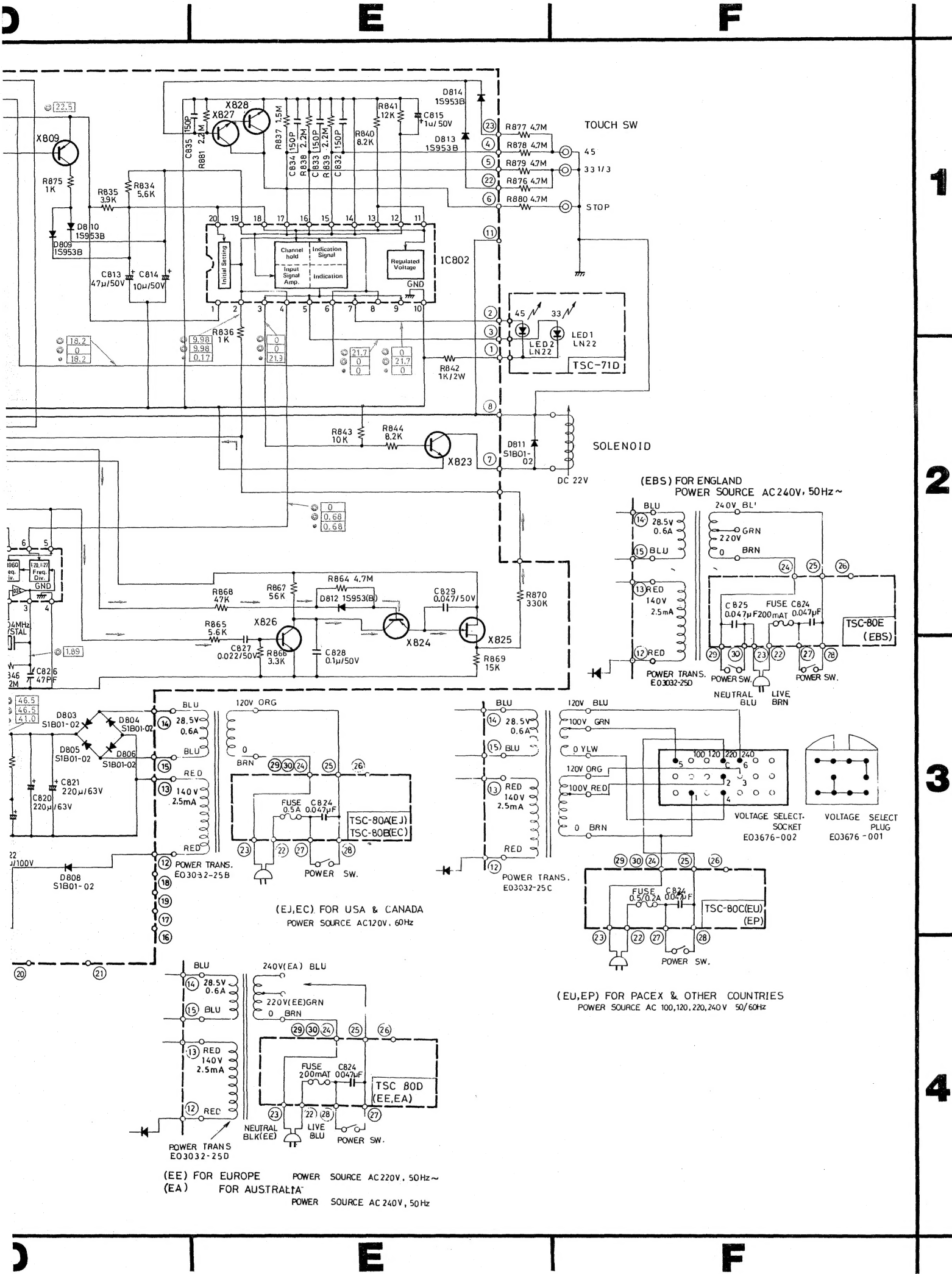


Circuit Board Ass'y Locations

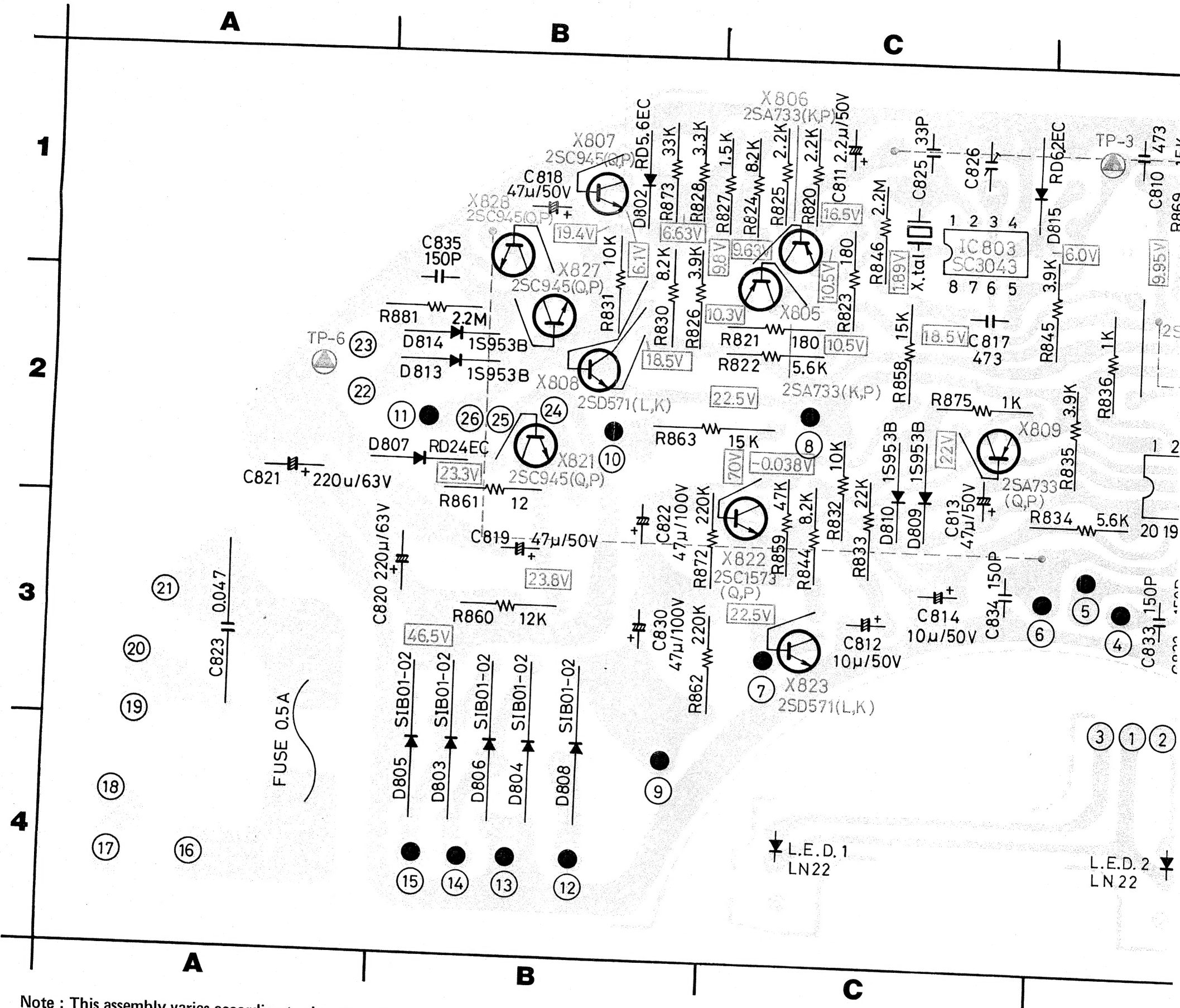
P.C. Board Ass'y	Description	Page
TXX-38B (or C)	Servo Control P.C. Board Ass'y	
TSC-80A (to E)	Power Supply P.C. Board Ass'y	

Transistor, IC and Diode Lead Identification



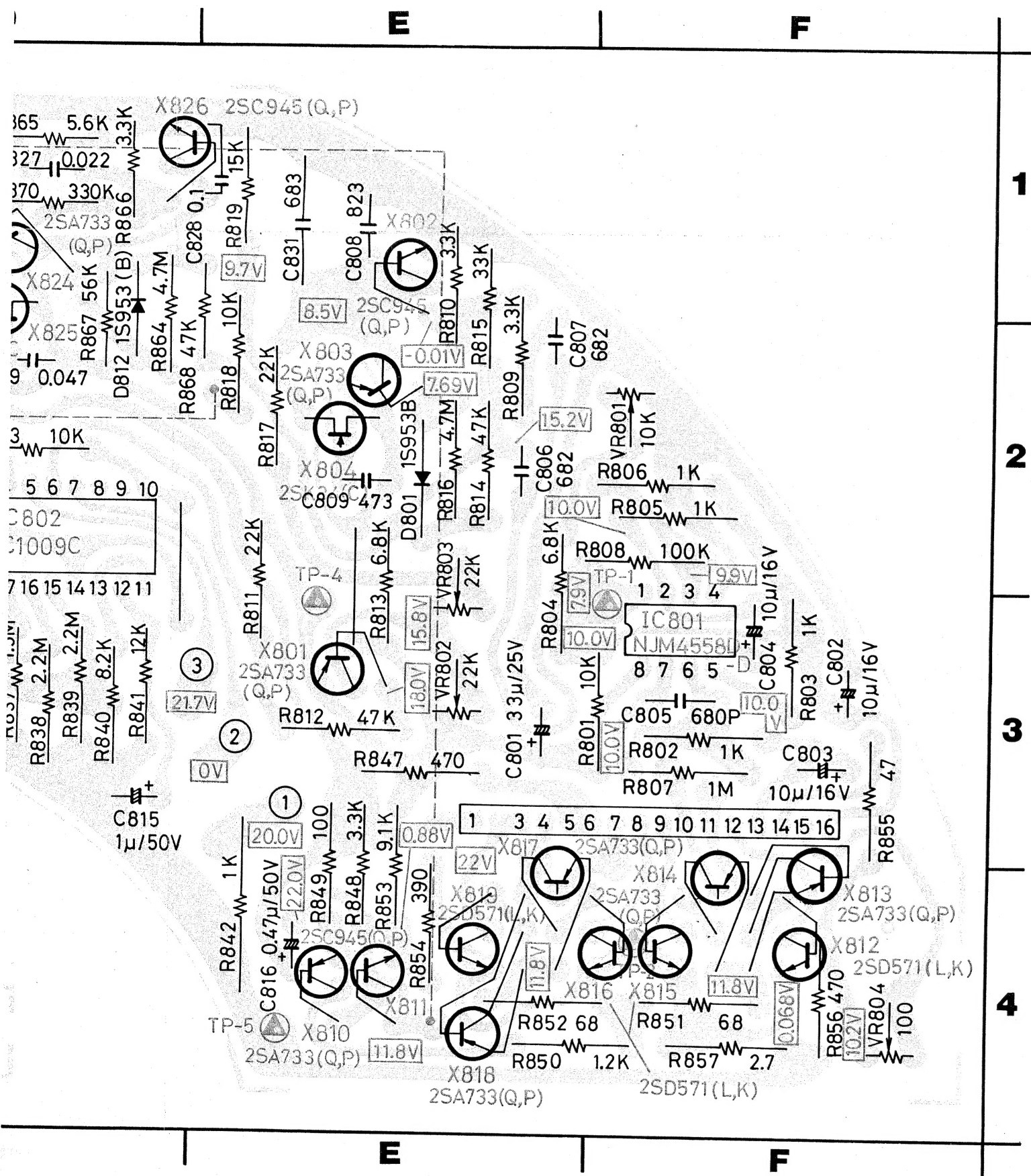


TXX-38B(or C) Servo Control P.C. Board Ass'y

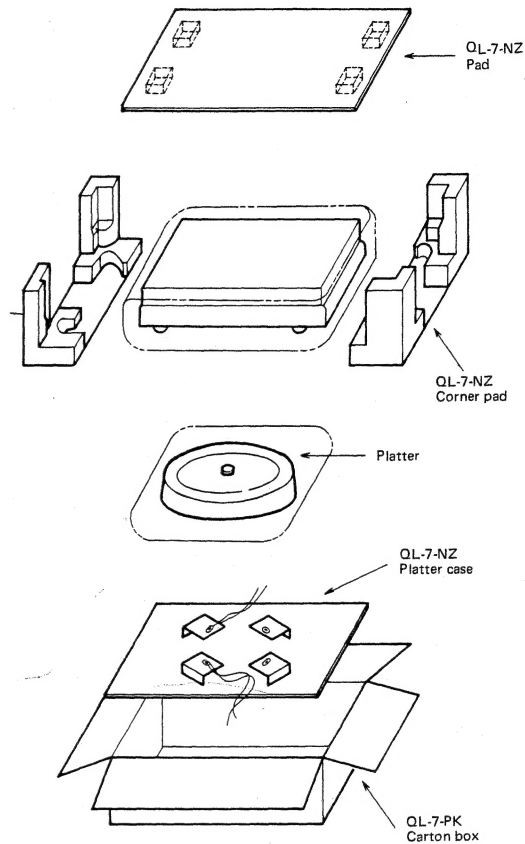


Note : This assembly varies according to the area where the unit is sold.

For U.S.A. & Canada	For Europe	For U.K.	For Australia	For U.S. Military Market & Other Countries
TXX-38B	TXX-38C	TXX-38C	TXX-38C	TXX-38C



13.Packing Materials and Part Numbers



14.Accessories List

Item No.	Part Number	Description	Q'ty
1	E30580-573A	Instruction Book	1
2	See below	Warranty Card	1
3	E48820-001	EP Adaptor	1
4	E64207-001	Envelope for Instruction Book and Others	1
5	E60259-002	Overhang Indicator	1
6	E04056	Simens Plug (for Military Market & Other Countries)	1
7	BT20023	Service Procedure (for U.S.A. only)	1
8	BT20024	"Do It Better" (for U.S.A. only)	1

Item No.	Description	U.S.A. & Canada	Europe	U.K.	Australia	U.S. Military Market & Other Countries
2	Warranty Card	BT20020C (U.S.A.) BT20025 (Canada)	Not enclosed	BT20013	BT20029	BT20014